

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-172479

(43)Date of publication of application : 30.06.1997

(51)Int.Cl.

H04M 1/05

H04M 1/19

H04M 1/20

H04R 1/00

(21)Application number : 07-349906

(71)Applicant : YOKOI KIKAKU:KK

(22)Date of filing : 20.12.1995

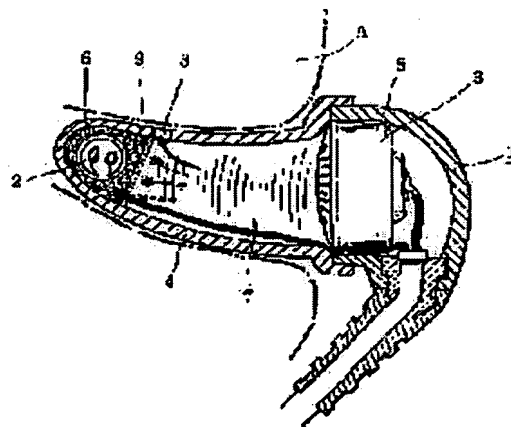
(72)Inventor : YOKOI MASAMICHI

## (54) TRANSMITTER-RECEIVER AND SPEAKER USING IT

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide both functions of a bone-conduction microphone and a speaker within one casing and to clearly hear the voice of a communicating party because noise is hardly mixed and howling is hardly generated.

SOLUTION: The bone-conduction microphone 2 and the speaker 3 are housed in one casing 4. The bone-conduction microphone 2 is housed in a tip part being the end part of the external auditory meatus inserting side of the casing 4, and a blowing agent 6 for absorbing vibration is arranged around the bone-conduction microphone 2. A cavity part 7 is provided between the blowing agent 6 inside the casing 4, and the speaker 3, and a through hole 8 passing through the inside/outside of the casing 4 is provided at the tip part of the cavity part 7.



## LEGAL STATUS

[Date of request for examination] 02.12.2002

[Date of sending the examiner's decision of rejection] 14.06.2005

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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## CLAIMS

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[Claim(s)]

[Claim 1] Are the headset equipped with and used for external auditory meatus, and the bone conduction microphone and the loudspeaker are stored in one casing. The bone conduction microphone is contained by the point which is the external-auditory-meatus insertion side edge section of casing. The headset characterized by allotting the foam for oscillating absorption to the perimeter of a bone conduction microphone, preparing the cavernous section between the foam in casing, and a loudspeaker, and preparing the through-hole which penetrates the inside and outside of casing in the point side of the cavernous section.

[Claim 2] It is the headset according to claim 1 characterized by preparing a step to which a point side becomes thin in casing, and preparing the through-hole in this step. [Claim 3] Are the headset equipped with and used for external auditory meatus, and the bone conduction microphone and the loudspeaker are stored in one casing. The bone conduction microphone is contained by the point which is the external-auditory-meatus insertion side edge section of casing. The foam for oscillating absorption is allotted to the perimeter of a bone conduction

microphone, and the cavernous section is prepared between the foam in casing, and a loudspeaker. The headset characterized by preparing the 1st through-hole near the point of the cavernous section, preparing the 2nd through-hole near the loudspeaker of the cavernous section, and preparing the slot between the 1st through-hole of a casing outside surface, and the 2nd through-hole.

[Claim 4] Claim 1 characterized by having a noise insulation member between the cavernous section in casing, and foam, a headset according to claim 2 or 3.

[Claim 5] Claim 1, claim 2, message equipment characterized by having the headset according to claim 3 or 4.

[Claim 6] Message equipment according to claim 5 characterized by performing transfer of the electrical signal between a headset and the body of message equipment by radio system.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to message equipments, such as telephone which used said headset for the headset list equipped with and used for one ear.

[0002]

[Description of the Prior Art] A bone conduction microphone is a microphone which a bone conduction sound signal is taken up from an external-auditory-meatus wall, and is changed into an electrical signal. Since it is possible to talk even if it will be those who have a failure in vocal cords, if a bone conduction microphone is used, it is used as a generating auxiliary machine etc.

[0003] The conventional headset is shown in drawing 10 . (\*\*) is the headset with which the external ear (A) was equipped. Loudspeaker (c) and bone conduction microphone (b) are

contained in the same casing (d) and (e). While filling up with resin (mosquito), such as silicon, between loudspeaker (\*\*) and bone conduction microphone (\*\*) and fixing bone conduction microphone (b), it is going to prevent that vibration of the air produced from loudspeaker (c) reaches direct bone conduction microphone (b).

[0004] Near loudspeaker (c) of casing (d), through-hole (g) for drawing the voice from loudspeaker (c) in the inner part of external auditory meatus through between casing (d) and external auditory meatus is prepared.

[0005]

[Problem(s) to be Solved by the Invention] However, resin (mosquito) is minded, bone conduction microphone (b) is reached, bone conduction microphone (b) incorporates the vibration, and the vibration by loudspeaker (\*\*) becomes an echo and causing [ mixing of the noise to dial tone, and ] a howling further.

[0006] Moreover, many of voice which through-hole (g) was located near external ear opening or in its outside, and came from through-hole (g) out of casing (d) since the gap of casing (d) and external auditory meatus was narrow leaks out of external ear opening, and it is a pile to propagation in the inner part of external auditory meatus.

[0007] And the great portion of voice from loudspeaker (\*\*) has few amounts of the voice which gets across to a resin (mosquito) side and comes out of through-hole (g) itself. Consequently, it is small that the user of headset (a) can be heard and it serves as voice which it is filled and is hard to catch.

[0008] Containing a bone conduction microphone and a loudspeaker to another casing, in order to cancel such a fault, equipping the external auditory meatus of a right ear with one side, and equipping the external auditory meatus of a left ear with another side is proposed. However, there is since a loudspeaker and a bone conduction microphone must be set to the problem that alien frequencies cannot be heard and both the lugs other than a loudspeaker, if indecent [ both lugs will be closed by a loudspeaker and the bone conduction microphone, and ], a problem of being inconvenient to handling, in this case.

[0009] Then, it is the headset equipped with the function of both a bone conduction microphone and a loudspeaker in one casing, and the message machine equipped with the headset which mixing or the howling of the noise to dial tone moreover cannot produce easily, and such a headset is called for.

[0010]

[Means for Solving the Problem] The headset (1) of claim 1 of this invention is what is equipped with and used for external auditory meatus. A bone conduction microphone (2) and a loudspeaker (3) One casing (4), (5) It is stored inside. A bone conduction microphone (2) Casing (4), It is contained by the point which is the external-auditory-meatus insertion side edge section of (5), and the foam for oscillating absorption (6) is allotted to the perimeter of a

bone conduction microphone (2). It is characterized by preparing the cavernous section (7) between the foam (6) in casing (4) and (5), and a loudspeaker (3), and preparing the through-hole (8) which penetrates the inside and outside of casing (4) in the point side of the cavernous section (7).

[0011] The headset (1) of claim 2 is characterized by preparing casing (4a) and a step (10) to which a point side becomes thin at (4b), and preparing a through-hole (8) and (11) in this step (10) in the above-mentioned headset.

[0012] The headset (1) of claim 3 is what is equipped with and used for external auditory meatus. A bone conduction microphone (2) and a loudspeaker (3) One casing (4c), (5) It is stored inside. A bone conduction microphone (2) Casing (4c), It is contained by the point which is the external-auditory-meatus insertion side edge section of (5), and the foam for oscillating absorption (6) is allotted to the perimeter of a bone conduction microphone (2). The cavernous section (7) is prepared between the foam (6) in casing (4c) and (5), and a loudspeaker (3). It is characterized by preparing the 1st through-hole (12a) near the point of the cavernous section (7), preparing the 2nd through-hole (12b) near the loudspeaker of the cavernous section, and preparing the slot (13) between the 1st through-hole of a casing (4c) outside surface, and the 2nd through-hole.

[0013] It is characterized by equipping the headset (1) of claim 4 with a noise insulation member (9) in each above-mentioned headset between casing (4), (4a), (4b), the inner (4c) cavernous section (7), and foam (6).

[0014] By these, a bone conduction microphone (2) is hardly influenced by the sound which a loudspeaker (3) emits, but can prevent mixing and the howling of the noise to dial tone. Moreover, since the sound from a loudspeaker comes from the cavity in casing out of casing through a through-hole and it is led in the inner part of external auditory meatus, a user can hear a message partner's talk clearly.

[0015] Moreover, since the message equipment (B) of this invention, (C), (D), and (E) are equipped with the above headsets (1), they can hold clear conversation. Since the body of a message device stops needing a telephone receiver style with a limit for the attaching position of a microphone and a loudspeaker like before, it can miniaturize sharply. If between a headset (1) and the bodies of message equipment is made into a wireless type, it will further become easy to use it.

[0016]

[Embodiment of the Invention] Hereafter, this invention is explained using a suitable example.

[Example 1] drawing 1 is the sectional view having shown the configuration of the headset of an example 1. Casing of a headset (1) is inserted in external auditory meatus, and turns into base side casing (5) holding a loudspeaker (3) from insertion side casing (4).

[0017] The bone conduction microphone (2) is attached near the point of insertion side casing

(4) through foam (6). Therefore, foam (6) is located in the perimeter of a bone conduction microphone (2).

[0018] Since foam (6) is allotted only to the point of insertion side casing (4), the base side of insertion side casing (4) serves as the cavernous section (7). In this example, the partition made of the low resilience rubber as a noise insulation member (9) was prepared between foam (6) and the cavernous section (7).

[0019] The through-hole (8) which opens the exterior and the cavernous section for free passage is prepared in the part which is near the point of insertion side casing (4), and is in contact with the cavernous section (7). This through-hole (8) may be prepared only in one place, and may be prepared in two or more places.

[0020] If a user talks, a bone conduction microphone (2) will take up a bone conduction sound signal from an external-auditory-meatus wall, and it tells the equipments (telephone etc.) with which the headset (1) was attached by making this into an electrical signal.

[0021] The sound from a loudspeaker (3) is emitted in insertion side casing (4), and progresses the inside of the cavernous section (7) to the front end section of insertion side casing (4) as vibration of air. However, since foam (6) is allotted to the point, vibration is absorbed, and it becomes vibration which is extent which cannot take up a bone conduction microphone (2). Therefore, a bone conduction microphone (2) is hardly influenced by the voice from a loudspeaker (3). This effect of intercepting noise will become still more remarkable if a noise insulation member (9) is prepared between the cavernous section (7) and foam (6).

[0022] The sound in the cavernous section (7) gets across to the space between insertion side casing (4) and external auditory meatus through a through-hole (8). Since the through-hole (8) is prepared in the location which entered the back from external ear opening unlike the conventional headset, leaking from external ear opening outside has few sounds which came out of the through-hole (8), and they are drawn in the inner part of external auditory meatus. Therefore, a user can catch the sound from a loudspeaker (3) clearly.

[0023] [Example 2] drawing 2 is the sectional view having shown the configuration of the headset of an example 2. Although the configuration with fundamental this example is the same as that of an example 1, it differs in that the step (10) is prepared near the through-hole (8) of insertion side casing (4a). The gap between a through-hole (8) and external auditory meatus becomes large by this, and it further becomes easy to catch the sound which came out of the through-hole.

[0024] [Example 3] drawing 3 is the sectional view having shown the configuration of the headset of an example 3. The configuration with fundamental this example is the same as that of an example 2, and the step (10) is prepared near the point of insertion side casing (4b). In this example, two or more slits (11) are prepared as a through-hole (8). The sound which came from this slit (11) out of insertion side casing (4b) is drawn in the inner part of external auditory

meatus.

[0025] [Example 4] drawing 4 is the sectional view having shown the configuration of the headset of an example 4. The configuration with fundamental this example is the same as that of an example 1, and is common in the example 1 also in that the through-hole (12a) is prepared near the point of insertion side casing (4c). However, in this example, the through-hole (12b) is prepared also near the base of insertion side casing (4c). And the slot (13) is prepared between these two through-holes (12a) and (12b).

[0026] The sound in insertion side casing (4c) is drawn in the inner part of external auditory meatus from the through-hole near a point (12a) like an example 1, and also it is drawn in the inner part of external auditory meatus from near [ near a point ] a through-hole (12a) through a slot (13) from the through-hole near a base (12b).

[0027] In addition, in each example of the above headset, although foam (6) was allotted to all the perimeters of a bone conduction microphone (2), as shown in drawing 5 , space (6a) may be prepared in part between casing (4).

[0028] [Example 5] this example is the message machine equipped with the above headsets, and shows the outline of the configuration to drawing 6 . (B) is the small general telephone connected to the headset (1) indicated by the example 1. (14) is a switch for an ON-OFF change. If a lug (A) is equipped with a headset (1) in the case of this example, since it is not necessary to talk with an earphone single hand like before, both hands can be used freely and it is convenient. Moreover, even when a perimeter is noisy, it can talk clearly. Furthermore, since a big earphone like before is not needed, the telephone itself can be made very small.

[0029] [Example 6] this example is the message machine equipped with the above headsets, and shows the outline of the configuration to drawing 7 . (C) is the small cellular phone connected to the headset (1) indicated by the example 1. As for a wristband and (C2), (C1) is [ a dc-battery and (C3) ] pocket electrode holders.

[0030] Since the talk is made in the case of this example, holding a cellular phone (C) on an arm, the waist, etc. using a wristband (C1) or a pocket electrode holder (C3), it can talk comfortably also in a walk. Moreover, since utterance by vocal cords is not needed, it can talk in small voice about which it whispers, and even if it uses it at the inside of an electric car, a restaurant, etc., a surrounding user cannot be troubled easily.

[0031] Furthermore, since the loudspeaker and the microphone needed to be installed in the location respectively near close to his ears and the month in the conventional cellular phone, the miniaturization of a cellular phone (C) was difficult, but in this example, since it is not necessary to install a microphone and a loudspeaker in the body of a cellular phone (C), it can consider as the micro cellular phone which is not in the former.

[0032] [Example 7] this example is the message machine equipped with the above headsets, and shows the outline of the configuration to drawing 8 . (D) is small PHS connected to the

headset (1) indicated by the example 1. As for a wristband and (D2), (D1) is [ a dc-battery and (D3) ] pocket electrode holders. Also in this example, the same effectiveness as the cellular phone of an example 6 is acquired.

[0033] [Example 8] this example is the message machine equipped with the above headsets, and shows the outline of the configuration to drawing 8 . (E) is the small medical-application IYAMA KU loudspeaker connected to the headset (1) indicated by the example 1. As for a wristband and (E2), (E1) is [ a dc-battery and (E3) ] pocket electrode holders.

[0034] If this example is used also as message equipment, a message of the patient who excised vocal cords, for example by operation can be presented. Moreover, a headset (1) is set to the patient contained by the exterior and the isolated room like an intensive care unit, and conversation of a patient and a visitor (or medical staff) is made clearly and smoothly within and without an intensive care unit by installing a body (E) out of an intensive care unit.

[0035] In addition, in the message machine of examples 5-8, although the headset (1) is connected with the telephone body etc. in code, it can also be used as the cordless message machine by radio system. In this case, since the limit in a code is lost, it further becomes easy to use.

[0036]

[Effect of the Invention] As stated above, it has the function of both a bone conduction microphone and a loudspeaker in one casing, and moreover is hard to produce mixing and the howling of a noise by this invention, and the headset which can also catch a message partner's voice clearly, and the micro message machine using it can be offered.

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#### DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing having shown the configuration of the headset of an example 1.

[Drawing 2] Drawing having shown the configuration of the headset of an example 2.

[Drawing 3] Drawing having shown the configuration of the headset of an example 3.

[Drawing 4] Drawing having shown the configuration of the headset of an example 4.

[Drawing 5] Drawing having shown the configuration of the headset which established space in foam.

[Drawing 6] Drawing having shown the configuration of the message equipment (general telephone) of an example 5.

[Drawing 7] Drawing having shown the configuration of the message equipment (cellular phone) of an example 6.

[Drawing 8] Drawing having shown the configuration of the message equipment (PHS) of an example 7.

[Drawing 9] Drawing having shown the configuration of the message equipment (medical-application IYAMA KU loudspeaker) of an example 8.

[Drawing 10] Drawing having shown the configuration of the conventional headset.

[Description of Notations]

- (1) Headset
- (2) Bone conduction microphone
- (3) Loudspeaker
- (4) Insertion side casing
- (5) Base side casing
- (6) Foam
- (7) Cavernous section
- (8) Through-hole
- (9) Noise insulation member
- (10) Step
- (11) Slit
- (12) Through-hole
- (13) Slot

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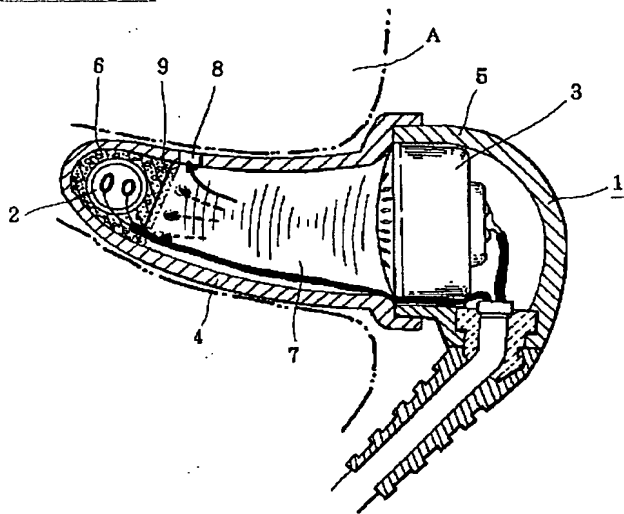
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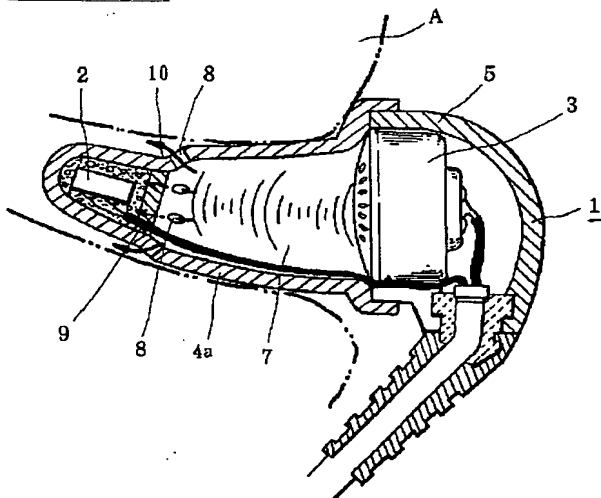
## DRAWINGS

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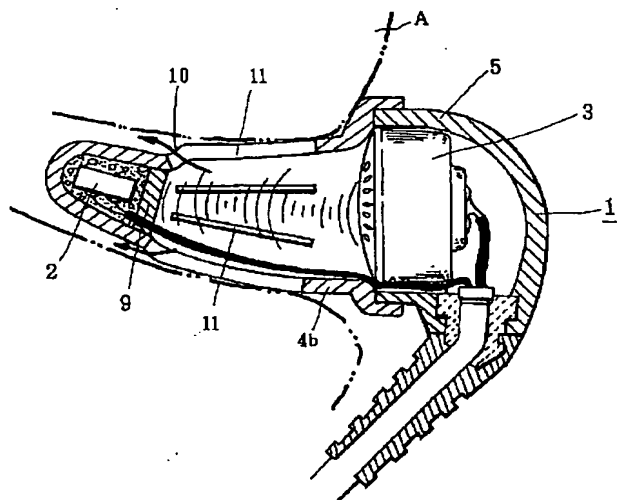
[Drawing 1]



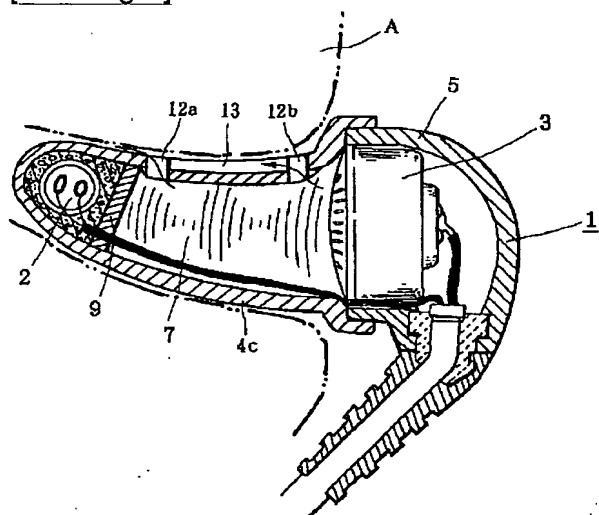
[Drawing 2]



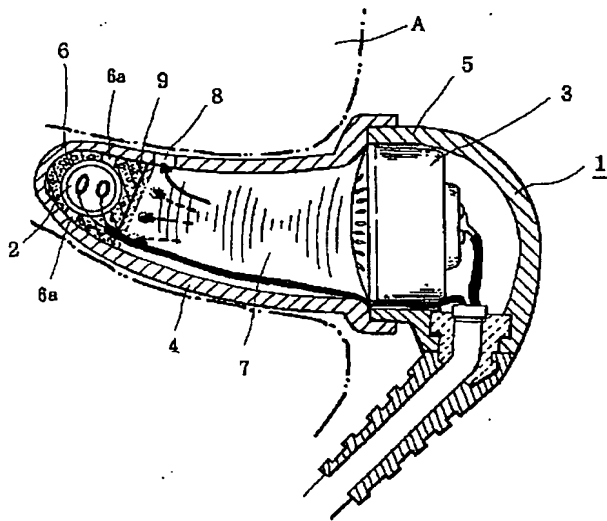
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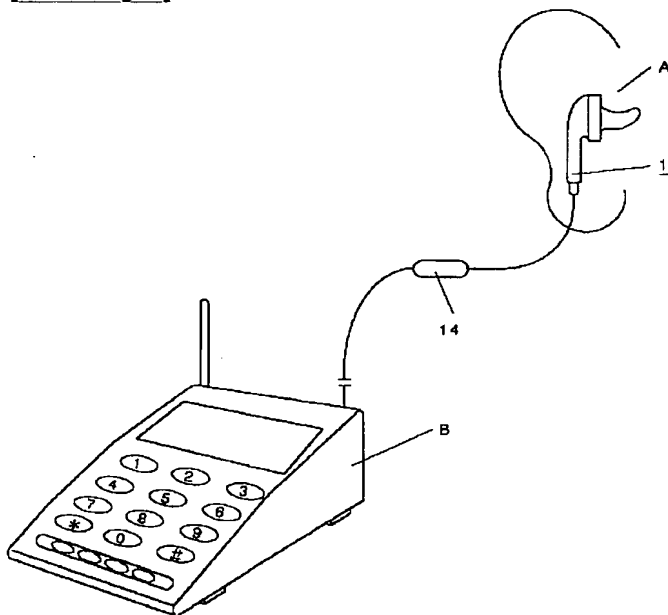
[Drawing 4]



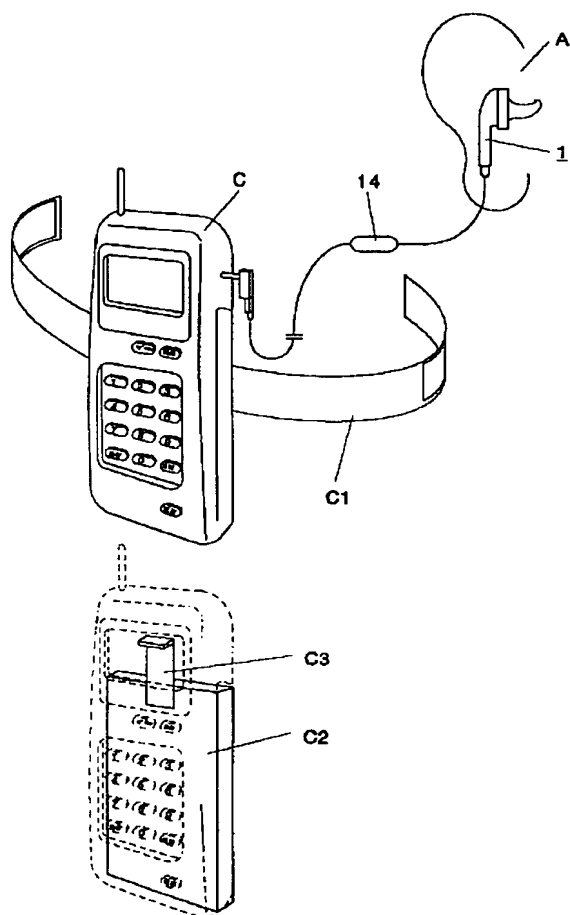
[Drawing 5]



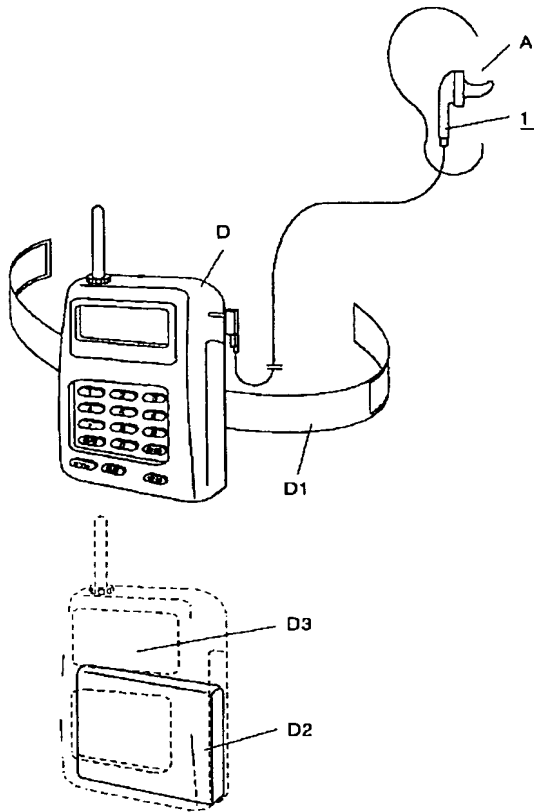
[Drawing 6]



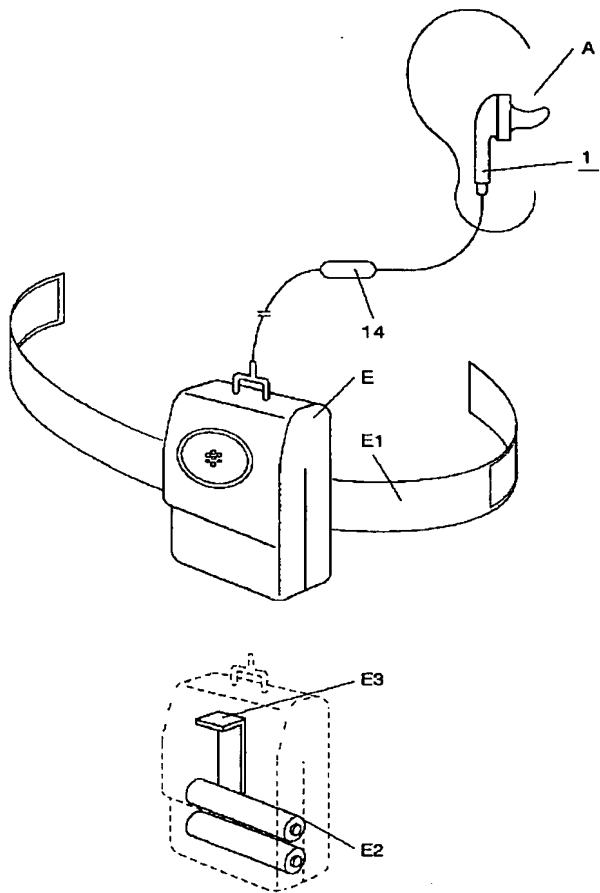
[Drawing 7]



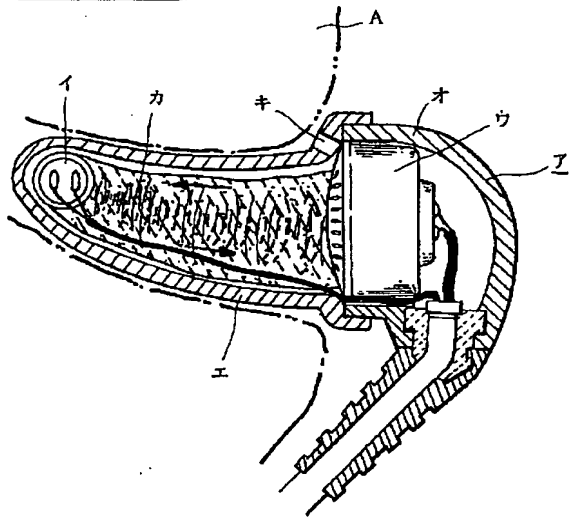
[Drawing 8]



[Drawing 9]



[Drawing 10]



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